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## SECTION 14240 - HYDRAULIC ELEVATORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes a 3-stop, hydraulic, 100 feet per minute (0.5 meters per second), 4500 lb (2000 kg) capacity service/hospital elevator.
- B. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
  - 2. Division 5 Section "Structural Steel" for the following:
    - a. Attachment plates, angle brackets, and other preparation of structural steel for fastening guide-rail brackets.
    - b. Structural-steel shapes for subsills that are part of steel frame.
  - 3. Division 5 Section "Metal Fabrications" for the following:
    - a. Attachment plates and angle brackets for supporting guide-rail brackets.
    - b. Pit ladders.
  - 4. Division 13 Section "Fire Alarm" for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
  - 5. Division 16 Section "Premises Telephone Wiring" for telephone service to elevators.
  - 6. Division 16 Sections for electrical service for elevators to and including disconnect switches at machine room door and standby power source, transfer switch, and connection from auxiliary contacts in transfer switch to controller.

#### 1.3 DEFINITIONS

- A. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

#### 1.4 SUBMITTALS



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- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
  - B. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
  - C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
  - D. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout as specified.
  - E. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators."
  - 1. Seismic Risk Zone: Project is located in Zone 2B.
- C. Accessibility Requirements: In addition to local governing regulations, comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."

#### 1.6 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

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1.7 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.
1. Warranty Period: 12 months from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.
1. Perform maintenance, including emergency callback service, during normal working hours.
    - a. Response Time: One day or less.
- B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide hydraulic elevators by one of the following:
1. Montgomery KONE Inc.
  2. Otis Elevator Co.
  3. Schindler Elevator Corp.

2.2 MATERIALS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.

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- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations. Provide either of the following:
1. Pump, with fan-cooled squirrel-cage induction motor, mounted on top of oil tank with vibration isolation mounts. Enclose pump in prime-painted steel enclosure lined with 1-inch- (25-mm-) thick, glass-fiber insulation board.
  2. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
  3. Provide motor with wye-delta, solid-state starting, or variable-voltage variable-frequency motor control.
- C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.
- D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.
1. Provide dielectric couplings at plunger/cylinder units.
  2. Casing for Underground Piping: PVC pipe complying with ASTM D 1785 joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.
- F. Protective Cylinder Casings: PVC pipe casings complying with ASME A17.1, of sufficient size to provide not less than 1-inch (25-mm) clearance from cylinder, and extending above pit floor.
- G. Corrosion Protective Filler: A solventless, petroleum-based gel formulated for filling the space between hydraulic cylinders and protective casings. Filler is heavier than water, electrically nonconductive, and liquefies at approximately 150 deg F (66 deg C).
- H. Car Frame and Platform: Welded steel units.
- I. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:
1. Satin Stainless Steel: ASTM A 666, Type 304, with No. 6, non-directional satin finish.

## 2.3 OPERATION SYSTEMS

- A. Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.
1. Single Elevator: Provide "selective collective automatic operation" as defined in ASME A17.1.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated.
1. Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with door open. Car can be manually put in service on standby

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- power, either for return operation or for regular operation, by switches in control panel located at main floor area. Manual operation causes automatic operation to cease.
2. Standby Powered Lowering: On activation of standby power, car is lowered to the lowest floor, open the door, and shut down.
  3. Emergency Hospital Service: a keyswitch or card reader initiates Service. On arriving at the floor, elevator opens its doors and parks. Car is placed in operation by selecting a floor and pressing door close button or by operating keyswitch to put car in independent service. After responding to floor selected or being removed from independent service, car is returned normal operation. If car is not placed in operation within a preset time after being called, it is returned to normal operation.
- C. Security Features: In addition to above operational features, provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.
1. Keyswitch Feature: Car and hall push buttons are activated and deactivated by security keyswitches. Key is removable only in deactivated position.
    - a. Access codes are programmed at each car-operating panel using a security keyswitch. Secured landing feature is activated and deactivated by a security keyswitch at the main landing.
  2. Card-Reader Operation: For access to restricted landings. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Allow space in car as indicated for card reader.
    - a. Card readers and other security access system equipment are by others.

## 2.4 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, non-yellowing translucent plastic.
- B. Car Control Stations: Provide fully recessed car control stations with applied metal faceplates. Mount in return panel adjacent to car door, if not otherwise indicated.
1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
  2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
  3. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)."
- D. Car Position Indicator: Provide illuminated-signal type, digital-display type, or segmented type. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
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1. Include travel direction arrows if not provided in car control station.
- E. Hall Push-Button Stations: Provide one hall push-button station at each landing.
  1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
  2. Provide units with direction-indicating buttons; two buttons at intermediate landings; one button at terminal landings.
- F. Hall Lanterns: Provide units with illuminated arrows, but provide single arrow at terminal landings.
  1. Place lanterns either above or beside each hoistway entrance, unless otherwise indicated. Mount at a minimum of 72 inches (1800 mm) above finished floor.
  2. With each lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
- G. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

## 2.5 DOOR REOPENING DEVICES

- A. Door Edge Device: Provide retractable edge shoes on elevator entrance doors that cause doors to stop and reopen upon contacting an obstruction. Include photoelectric device with timed cutout that projects dual-light beams across car entrance at 5- and 29-inch (125- and 740-mm) heights; the beams, when interrupted, cause doors to stop and reopen.
  1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

## 2.6 ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard steel car enclosures with removable wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.
  1. Floor finish is specified in another Section.
  2. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch (13-mm) fire-retardant-treated particleboard with plastic-laminate panel backing complying with NEMA LD 3, Type BKV and manufacturer's standard protective edge trim. Panels have a flame-spread rating of 25 or less, when tested according to ASTM E 84.
  3. Fabricate car with recesses and cutouts for signal equipment.
  4. Fabricate car doorframe integrally with front wall of car.
  5. Stainless-Steel Doors: Flush, hollow-metal construction, fabricated from stainless steel.
  6. Sills: Extruded metal, with grooved surface, 1/4 inch (6 mm) thick. Provide polished finish on nickel silver.
  7. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of Lexan plastic complying with flammability requirements.
  8. Handrails: Manufacturer's standard handrails, of flat tubular satin stainless steel.

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## 2.7 HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.
  - 1. Where gypsum board wall construction is indicated, provide self-supporting frames with reinforced head sections.
- B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
  - 1. Enameled-Steel Frames: Formed steel sheet.
  - 2. Stainless-Steel Doors and Transoms: Flush, hollow-metal construction, fabricated from stainless steel.
  - 3. Sills: Extruded metal, with grooved surface, 1/4 inch (6 mm) thick. Provide polished finish on nickel silver.
  - 4. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C 1107.

## 2.8 PASSENGER ELEVATORS

- A. Elevator No.: 1.
  - 1. Type: Under-the-car single cylinder.
  - 2. Rated Load: 4500 lb (2000 kg).
  - 3. Rated Speed: 100 fpm (0.5 m/s).
  - 4. Operation System: Selective collective automatic operation.
  - 5. Auxiliary Operations:
    - a. Standby power operation.
    - b. Standby powered lowering.
    - c. Emergency hospital service at all floors.
    - d. Independent service.
  - 6. Security Features: Keyswitch feature and Card-reader operation.
  - 7. Car Enclosures: As follows:
    - a. Inside Width: 68 inches (1700 mm).
    - b. Inside Depth: 116 inches (2950 mm).
    - c. Inside Height: 96 inches (2400 mm).
    - d. Front and Rear Walls: Satin stainless steel with integral car doorframes.
    - e. Car Fixtures: Satin stainless steel.
    - f. Side Panels: Plastic laminate.
    - g. Reveals: Satin stainless steel.
    - h. Door Faces (Interior): Satin stainless steel.
    - i. Door Sills: Nickel silver.
    - j. Ceiling: Luminous ceiling.
    - k. Handrails: Satin stainless steel at sidewalls.
    - l. Floor prepared to receive sheet vinyl (specified in Division 9 Section "Sheet Vinyl Floor Coverings").
  - 8. Hoistway Entrances: As follows:
    - a. Width: 48 inches (1200 mm).
    - b. Height: 84 inches (2100 mm).
    - c. Type: Single-speed side sliding.

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- d. Frames: Satin stainless steel.
- e. Doors: Satin stainless steel.
- f. Sills: Nickel silver.
- 9. Hall Fixtures: Satin stainless steel.
- 10. Additional Requirements: As follows:
  - a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
  - b. Provide protective blanket hooks and one complete set of full-height blankets.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Verify critical dimensions, and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of cylinders; comply with applicable requirements in Division 2 Section "Earthwork."
  - 1. Provide waterproof well casings as necessary to retain walls of well hole.
- B. Install cylinders in protective casings within well hole or casing. Before installing protective casing, remove water and debris from well hole or casing and provide permanent waterproof seal at bottom of well casing. Fill void space between protective casing and cylinder with corrosion-protective filler.
  - 1. Align cylinders and fill space between well casing and protective casing with fine sand.
- C. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between casing and pit floor with 4 inches (100 mm) of non-shrink, nonmetallic grout.
- D. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.
- E. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.
- F. Lubricate operating parts of systems as recommended by manufacturers.
- G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and





frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

- H. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- I. Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, nonmetallic grout.

### 3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.

### 3.4 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

### 3.5 PROTECTION

- A. Temporary Use: Do not use elevators for construction purposes unless cars are provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damage.
  - 1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.
  - 2. Provide protective coverings, barriers, devices, signs, and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator In-



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staller to restore damaged work so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

END OF SECTION 14240

